



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/711,324

11/13/2000

Kei-Yu Ko

3526.4US (97-1136.4)

7008

24247

7590

09/22/2003

TRASK BRITT

P.O. BOX 2550

SALT LAKE CITY, UT 84110

EXAMINER

CHEN, KIN CHAN

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 09/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/711,324

Applicant(s)

KO ET AL.

Examiner

Kin-Chan Chen

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,5 and 7-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5 and 7-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on July 21/2003 has been entered.

Claim Rejections - 35 USC § 112

2. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed.

Newly amended claims 1 and 20 contain several new matters. For example, "consisting essentially of" excludes other materials which is not recited in the specification.

Any exclusionary provision must have basis in the original disclosure. The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a prima facie case for lack of descriptive support. Ex parte Parks, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993).

Newly amended claim 18 (lines 3-4) is new matter.

Newly added claims 42 and 46, "including at least one carrier gas" is new matter.

3. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims do not clearly set forth the metes and bounds of the patent protection desired. In claims 1 and 20, the close-ended transitional phrase "consisting essentially of" is used, however, in dependent claims (e.g., claims 8, 9, 11), the open-ended transitional phrase "comprises" is used. As such, a person of ordinary skill in the art could not interpret the metes and bounds of the claims. For the patent examining purpose, the examiner interprets the claims are all **open-ended** in light of the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

Art Unit: 1765

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 4, 5, and 7-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ding et al. (US 5,814,563) in view of Bosch et al. (US 5,626,716).

Ding teaches that a substrate may have a dielectric layer (e.g., doped (e.g., BPSG) and undoped silicon dioxide (e.g., TEOS)), see col. 1, lines 19-21. The substrate may be etched using a fluorohydrocarbon gas selected from the group consisting of CH_3F , CHF_3 , C_2HF_5 , $\text{C}_2\text{H}_2\text{F}_2$, and $\text{C}_2\text{H}_4\text{F}_2$ (col. 2, lines 62-64). Therefore, it would be obvious to one skilled in the art that CHF_3 and $\text{C}_2\text{H}_4\text{F}_2$ are **equivalent**, containing similar etching characteristics, substitution of one for the other for etching dielectric layer would have anticipated to produce an expected result. The above $\text{C}_2\text{H}_4\text{F}_2$ reads on the limitations of "comprising $\text{C}_2\text{H}_x\text{F}_y$, where x is an integer from 3-5, y is an integer from 1 to 3 and $x + y = 6$ " in the instant claims. The dielectric layer may comprise plurality of layers. (col. 3, lines 54-62). The etching process provides high etching rates and good etching selectivity ratios (col. 2, lines 22-35).

Unlike the claimed invention, Ding does not explicitly state that the dry etchant may be formulated to etch doped silicon dioxide with selectivity over (or at faster rate in instant claim 20) at least undoped silicon dioxide. In plasma etching of semiconductors, Bosch teaches that it is known that in dry etching process, the doped silicon oxide (such as the addition of the boron and phosphorous to the oxides) is etched at a faster rate than undoped silicon oxide (col. 2, lines 9-12). In addition, Bosch teaches a process for selectively etching a structure comprising doped silicon dioxide. The structure may be

Art Unit: 1765

exposed to a fluorohydrocarbon etchant such as CHF_3 . The structure may be removed down to an etch stop adjacent the structure and comprising undoped silicon dioxide. The removing may take place without substantially removing the etch stop (col. 2, lines 37-43; col. 4, lines 44-48). As stated above, because Ding shows that CHF_3 and $\text{C}_2\text{H}_4\text{F}_2$ are **equivalent**, containing similar etching characteristics, substitution of one for the other for etching dielectric layer would have anticipated to produce an expected result. Therefore, one skilled in the art at the time of the invention would have found it obvious to modify Ding by using the principles of Bosch to formulate the etchant of Ding (such as $\text{C}_2\text{H}_4\text{F}_2$ and others as additives) in order to provide required etching selectivity ratios.

The substitution of one known equivalent technique for another may be obvious even if the prior art does not expressly suggest the substitution. *Ex parte Novak* 16. USPQ 2d 2041 (BPAI 1989); *In re Mostovych* 144 USPQ 38 (CCPA 1964); *In re Leshin* 125 USPQ 416 (CCPA 1960); *Graver Tank & Manufacturing Co. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

Substitution of known equivalent structures. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971).


As to claim 2 and 21, Bosch teaches doped silicon dioxide with selectivity over silicon nitride (col.2, lines 37-39). For the same discussion above, the etchant of Ding may be formulated to do so.

As to claims 3-7 and claims 22-26, Ding teaches these features (see col. 6, lines 1-14).

13, 27 and 32, Ding teaches using CH_2F_2 and CH_3F (col. 6, lines 11, 16, 28, 30 and 35, Ding teaches using CF_4 and CHF_3 (col. 6, claims 42 and 46, Ding teaches using carrier gas (inert gas). 14, 15, 17, 18, 19, 29, 31, 33, 34, 36-41, 43-45 differ from the prior art compositions or concentrations. However, the same materials are used. It is the examiner's position that a person having ordinary skill in the art at the time of the claimed invention would have found it obvious to vary the compositions by using various compositions and different concentrations known to be result-effective variables, and routine experimentation would be required to optimize them.

Concerning this communication or earlier communications from the examiner, the examiner is directed to Kin-Chan Chen whose telephone number is (703) 305-2667. If each of the attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, [redacted] can be reached on (703) 305-2667. The fax phone number for the examiner is (703) 872-9306. If the nature or relating to the status of this application or proceeding is not clear from the information given, the receptionist whose telephone number is (703) 308-2934.

2003


Kin-Chan Chen
Primary Examiner
Art Unit 1765